

520 Rec'd PCT/PTO 15 OCT 1999

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

0020-4621P

097403224

INTERNATIONAL APPLICATION NO. PCT/JP98/01692	INTERNATIONAL FILING DATE 14 April 1998	PRIORITY DATE CLAIMED 15 April 1997
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TITLE OF INVENTION
CURING COMPOSITION OF FLUORORUBBER AND MOLDED ARTICLE OF FLUORORUBBER

APPLICANT(S) FOR DO/EO/US
MATSUMOTO, Koji; SHIRAI, Yoshihiro

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39 (1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(3)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98./International Search Report with cited references
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 1. Preliminary Amendment w/Amended Claims
 2. Zero (0) Sheets of Formal Drawings



09/403224

PCT/JP98/01692

0020-4621PCT

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):**

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO. \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO \$840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO. \$760.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30
months from the earliest claimed priority date (37 CFR 1.492(e)). \$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total Claims	6 - 20 =		X \$18.00
Independent Claims	1 - 3 =		X \$78.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00
TOTAL OF ABOVE CALCULATIONS =			\$ 840.00
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).			\$ 840.00
SUBTOTAL =			\$ 840.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$
TOTAL NATIONAL FEE =			\$ 840.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +			\$ 40.00
TOTAL FEES ENCLOSED =			\$ 880.00
			Amount to be: refunded \$
			charged \$

a. ☒ A check in the amount of **\$880.00** cover the above fees is enclosed.b. ☐ Please charge my Deposit Account. No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 02-2448.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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ANDREW D. MEIKLE
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32,868

REGISTRATION NUMBER

/mah

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PATENT
0020-4621P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: MATSUMOTO, Koji et al
Int'l. Appl. No.: PCT/JP98/01692
Appl. No.: NEW Group:
Filed: October 15, 1999 Examiner:
For: CURING COMPOSITION OF FLUORORUBBER
AND MOLDED ARTICLE OF FLUORORUBBER

PRELIMINARY AMENDMENT**BOX PATENT APPLICATION**

Assistant Commissioner for Patents
Washington, DC 20231

October 15, 1999

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

AMENDMENTSIN THE SPECIFICATION:

Please amend the specification as follows:

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/JP98/01692 which has an International filing date of April 14, 1998, which designated the United States of America.--

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REMARKS

The specification has been amended to provide a cross-reference to the previously filed International Application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 

ANDREW D. MEIKLE Reg. # 32,868

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(Rev. 03/30/99)

SPECIFICATION

CURING COMPOSITION OF FLUORORUBBER AND MOLDED ARTICLE OF FLUORORUBBER

5 FIELD OF THE INVENTION

The present invention relates to a curing composition of a fluororubber, and a molded article of a fluororubber. In particular, the present invention relates to a curable composition of a fluororubber, which provides a molded article having
10 practically sufficient properties, for example, heat-resistance, without secondary curing, and a molded article of a fluororubber which is produced by molding and curing such a composition.

BACKGROUND ART

Fluororubbers are used as industrial materials in a wide
15 variety of technical fields, since they have much better heat-resistance, oil-resistance, solvent-resistance, chemical-resistance, etc. than general-purpose rubbers.

Fluororubbers are often used under severe conditions such as a temperature of 200°C by making use of their particularly good
20 heat-resistance. However, for achieving heat-resistance under such severe conditions, it is inevitable to mold the curable composition of fluororubbers, subjecting the molded article to primary curing and then subjecting the cured article to secondary curing to complete crosslinking and to release gasses generated
25 in the course of crosslinking.

SUMMARY OF THE INVENTION

However, a curing composition comprising a fluororubber, which provides a molded article having practically sufficient

properties only by primary curing without secondary curing, has been sought, since the secondary curing requires a large amount of heat energy and additional work.

Thus, one object of the present invention is to provide such
5 a curing composition of a fluororubber.

Accordingly, the present invention provides a curing composition of a fluororubber comprising a fluororubber which is curable with an organic peroxide, a polyfunctional unsaturated compound, and an organic peroxide, wherein the total amount of
10 acetone and tert.-butanol contained in the decomposed products of said organic peroxide, which are generated at a curing temperature, is 2 moles or less per one mole of the decomposed products.

DETAILED DESCRIPTION OF THE INVENTION

15 Fluororubbers contained in the composition of the present invention may be any known fluororubbers that can be cured with organic peroxides. Preferred examples of such fluororubbers are as follows:

Vinylidene fluoride base fluororubbers:

20 VdF-HFP copolymers, VdF-HFP-TFE copolymers, VdF-PFP copolymers, VdF-PFP-TFE copolymers, VdF-PEMVE-TFE copolymers, VdF-PFMVE-HFP copolymers, VdF-CTFE copolymers, VdF-HFP-E copolymers, VdF-HFP-TFE-E copolymers

The abbreviations used in the above have the following
25 meanings:

VdF: Vinylidene fluoride

HFP: Hexafluoropropylene

TFE: Tetrafluoroethylene

PFPP: Pentafluoroprpylene

PFMVE: Perfluoro(methyl vinyl ether)

CTFE: Chlorotrifluoroethylene

E: Ethylene

5 Propylene-tetrafluoroethylene fluororubbers:

Propylene (30-60 mole %)-tetrafluoroethylene (40-70 mole %) copolymers

Such copolymers may comprise 0 to 20 mole % of one or more other monomers which can be copolymerizable therewith.

10 Tetrafluoroethylene-perfluoro(alkyl vinyl ether) copolymers:

Tetrafluoroethylene (40-85 mole %)-perfluoro(alkyl vinyl ether) (15-60 mole %) copolymers

Other fluororubbers:

15 Fluorosilicone rubbers, polyfluoroalkoxyphosphazene rubbers.

There are various methods to make fluororubbers curable with organic peroxides.

For example, fluororubbers are prepared by polymerizing
20 monomers in the presence of iodine-containing compounds such as CH_2I_2 , or iodine/bromine-containing compounds such as CH_2IBr , by copolymerizing diene compounds such as $\text{CF}_2=\text{CF}-\text{CF}=\text{CF}_2$, or by heat treating prepared polymer to introduce double bonds in molecules.

Polyfunctional unsaturated compounds contained in the
25 composition of the present invention may be ones that are known as curing aids. Preferred examples of polyfunctional unsaturated compounds are triallyl isocyanurate, trimethallyl isocyanurate, triallyl cyanurate, triacryl formal, triallyl trimellitate, etc.

The amount of polyfunctional unsaturated compounds is from 0.1 to 10 wt. parts, preferably from 1 to 5 wt. parts, per 100 wt. parts of the fluororubbers.

- Organic peroxides used according to the present invention
- 5 are such compounds that generate decomposed products containing acetone and tert.-butanol in a total amount of 2 moles or less per one mole of the decomposed products, when they are decomposed under a curing temperature condition.

- Table 1 summarizes the compositions of low-boiling
- 10 decomposed products of several known organic peroxides under curing temperature conditions.

Table 1

Organic peroxide	Low-boiling decomposed products (mole/mole)			
	Methane	Ethane	Acetone	tert.-butanol
1	0.56	0.37	2.14	1.30
2	1.15	0	0	0
3	0.62	0	0.32	0.7
4	0.53	0	0.56	1.14

Notes 1: 2,5-Dimethyl-2,5-bis(tert.-butylperoxy)hexane
(Perhexa 25B)

- 15 2: Dicumyl peroxide (Percumyl D)
3: tert.-Butylcumyl peroxide (Perbutyl C)
4: di-tert.-Butyl peroxide (Perbutyl D)

- Among the organic peroxides which generate decomposed
- 20 products containing 2 mole/mole or less of acetone and tert.-butanol in total, dicumyl peroxide is preferable, since it generates neither acetone nor tert.-butanol.

- The amount of organic peroxides is from 0.3 to 1.2 wt. parts, preferably from 0.4 to 1.0 wt. parts, per 100 wt. parts of
- 25 fluororubbers. When the amount of organic peroxides exceeds 1.2

wt. parts, the weight change in use increases, which may cause some practical problems.

The curing composition of fluororubbers according to the present invention may optionally contain conventional additives
5 which are compounded in fluororubbers, for example, fillers, processing aids, plasticizers, colorants, etc.

The curing composition of fluororubbers according to the present invention can provide cured molded articles, which have practically sufficient properties and in which the contribution
10 of secondary curing to a compression set (which will be defined below) is 30 % or less, only by primary curing which is applied to the conventional curing compositions of fluororubbers.

Curing conditions may be the same as those used to cure the conventional curing compositions of fluororubbers. For example,
15 the compositions are cured for 0.1 to 1 hours at a curing temperature in a range between 150 and 190°C, under a curing pressure in a range between 1 and 10 Pa.

EXAMPLES

Comparative Example 1

20 Medium thermal carbon (MT-C) (20 wt. parts), triallyl isocyanurate (TAIC-M60, 60 % diluted product of triallyl isocyanurate, manufactured by NIPPON KASEI KABUSHIKI KAISHA) (6.7 wt. parts) and Perhexa 25B (manufactured by NOF Corporation) (0.5 wt. part) were compounded in DAIEL G-912 (an iodine-containing
25 fluororubber manufactured by DAIKIN INDUSTRIES, LTD.) (100 wt. parts), and well kneaded on open rolls to obtain a testing compound.

The obtained compound was molded, and subjected to primary

curing at 160°C for 10 minutes, and secondary curing at 180°C for 4 hours to obtain a sheet (120 mm x 150 mm x 2 mm) for the measurement of physical properties, and a P-24 O-ring for the measurement of a compression set.

- 5 With a molded product which had been primarily cured and one which had been primarily and secondarily cured, the following measurements were carried out.

M_{100} (100 % modulus), T_s (tensile strength at break) and E_b (elongation at break) of a sheet were measured according to JIS
10 K6301, and H_s (hardness) of a sheet was measured according to JIS K6253, Type A.

ΔW was a weight change rate expressed by the formula:

$[(\text{weight of secondarily cured product} - \text{weight of primarily cured product}) / (\text{weight of primarily cured product})] \times 100 \%$

- 15 CS (compression set) was measured using a P-24 O-ring, which is defined by JIS B2401, under the conditions of 200°C, 70 hours and 25 % compression, according to JIS K6301.

 The contribution of secondary curing to a compression set was evaluated by the formula:

- 20 $[(CS_1 - CS_2) / CS_2] \times 100 \%$

 in which CS_1 is the compression set of a primarily cured product, and CS_2 is the compression set of a secondarily cured product.

 Comparative Examples 2 and 3

- A composition was prepared, a sheet and an O-ring were molded
25 and then their properties were measured by the same methods as in Comparative Example 1 except that the amount of Perhexa 25B was changed to 1.0 wt. part or 1.5 wt. parts.

 Comparative Examples 4 and 5

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A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that 0.25 wt. part or 1.5 wt. parts of Percumyl D (manufactured by NOF Corporation) was used in place of Perhexa 25B.

Comparative Example 6

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that DAIEL G-902 (an iodine-containing fluororubber manufactured by DAIKIN INDUSTRIES, LTD.) was used as a fluororubber.

Comparative Example 7

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that DAIEL G-902 (an iodine-containing fluororubber manufactured by DAIKIN INDUSTRIES, LTD.) was used as a fluororubber, and the amount of Perhexa 25B was changed to 1.5 wt. parts.

Examples 1 and 2

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that 0.5 wt. part or 1.0 wt. part of Percumyl D was used in place of Perhexa 25B.

Example 3

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that 1.0 wt. part of Perbutyl C was used in place of Perhexa 25B.

Example 4

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that 1.0 wt. part of Perbutyl D was used in place of Perhexa 25B.

Example 5

A composition was prepared, a sheet and an O-ring were molded and then their properties were measured by the same methods as in Comparative Example 1 except that DAIEL G-902 (an iodine-containing fluororubber manufactured by DAIKIN INDUSTRIES, LTD.) was used as a fluororubber, and 0.5 wt. part of Percumyl D was used in place of Perhexa 25B.

The results are shown in Table 2.

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Table 2

Table 2	Comparative Example No.										Example No.				
	1	2	3	4	5	6	7	1	2	3	4	5			
Composition	100	100	100	100	100	---	---	100	100	100	100	---			
-DAIEL G-912	---	---	---	---	---	100	100	---	---	---	---	100			
-DAIEL G-902	20	20	20	20	20	---	---	20	20	20	20	20			
-MT-C	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7			
-TAIC M60	0.5	1.0	1.5	---	---	0.5	1.5	---	---	---	---	---			
-Perhexa 25B	---	---	---	0.25	1.5	---	---	0.5	1.0	---	---	0.5			
-Percumyl D	---	---	---	---	---	---	---	---	---	---	---	---			
-Perbutyl C	---	---	---	---	---	---	---	---	---	1.0	---	---			
-Perbutyl D	---	---	---	---	---	---	---	---	---	---	1.0	---			
Mechanical properties aft. primary curing (160°C x 10 min.)															
-M ₁₀₀	112	119	114	62	115	37	40	119	100	128	131	39			
-T ₁₀	205	216	186	166	195	180	206	211	195	225	227	184			
-E ₁₀	170	170	170	240	170	350	310	175	170	175	165	320			
-H ₅	74	75	73	73	73	72	71	75	74	74	75	72			
-CS (200°C x 70 hrs)	29.5	24.9	25.0	37.0	24.0	27	30.0	21.8	21.2	23.9	23.3	23			
Mechanical properties aft. secondary curing (180° x 4 hrs.)															
-M ₁₀₀	152	147	154	89	151	46	51	148	135	164	153	49			
-T ₁₀	273	252	284	228	248	230	254	253	264	275	276	221			
-E ₁₀	175	165	160	210	160	300	280	165	160	165	165	300			
-H ₅	77	77	77	74	77	72	74	77	76	77	77	72			
-CS (200°C x 70 hrs)	20.4	17.3	17.1	18.9	17.3	23.0	28.0	19.0	16.9	19.1	18.0	21			
-ΔW (%)	0.44	0.95	1.20	0.42	1.13			0.51	0.42	0.76	0.37				
[(CS ₁ -CS ₂)/CS ₂] ₁ x100 (%)	44.6	43.9	46.2	95.8	36.7	17.4	7.1	14.7	25.4	25.1	29.4	9.5			

As can be understood from the results of Examples 1-5, the compositions of the present inventions provide O-rings having a small compression set (200°C x 70 hours) only by primary curing.

As can be seen from the results of Comparative Example 4,
5 the use of dicumyl peroxide in an amount of 0.25 wt. part deteriorates a compression set, since the curing does not sufficiently proceed. The results of Comparative Example 5 indicates that the use of dicumyl peroxide in an amount of 1.5 wt. parts significantly increases the weight change ΔW (%).

10 Molded articles, which are produced by curing the compositions of the present invention, have less contribution of secondary curing to a compression set, and achieve a smaller compression set than those produced from conventional compositions after the primary curing, when the same fluororubbers
15 are used. Thus, it is understood that molded articles produced from the compositions of the present invention have good practical usefulness without being secondarily cured.

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CLAIMS

1. A curing composition of a fluororubber comprising
100 parts by weight of a fluororubber which is curable with
an organic peroxide,

5 0.1 to 10 parts by weight of a polyfunctional unsaturated
compound, and

0.3 to 1.2 parts by weight of an organic peroxide,
wherein the total amount of acetone and tert.-butanol contained
in the decomposed products of said organic peroxide, which are
10 generated at a curing temperature, is 2 moles or less per one mole
of the decomposed products.

2. A curing composition according to claim 1, wherein said
fluororubber is an iodine-containing fluororubber containing 0.01
to 5 % by weight of iodine atoms.

15 3. A curing composition according to claim 1, wherein said
organic peroxide is dicumyl peroxide.

4. A curing composition according to any one of claims 1
to 3, wherein the amount of said organic peroxide is from 0.4 to
1.0 parts by weight per 100 parts by weight of said fluororubber.

20 5. A molded article of a fluororubber comprising a cured
material of a curing composition as claimed in claim 1.

6. A molded article according to claim 5, wherein the
contribution of secondary curing to a compression set defined by
the following formula is 30 % or less:

25
$$[(CS_1 - CS_2)/CS_2] \times 100 \%$$

in which CS_1 is the compression set of a primarily cured product,
and CS_2 is the compression set of a secondarily cured product.

ABSTRACT

A curing composition of a fluororubber comprising a fluororubber which is curable with an organic peroxide, for example, an iodine-containing fluororubber, a polyfunctional
5 unsaturated compound, and an organic peroxide, for example, dicumyl peroxide, in which the total amount of acetone and tert.-butanol contained in the decomposed products of the organic peroxide, which are generated at a curing temperature, is 2 moles or less per one mole of the decomposed products.

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ATTORNEY DOCKET NO.
0020-14621P

PLEASE NOTE:
YOU MUST
COMPLETE THE
FOLLOWING:

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title: → CURING COMPOSITION OF FLUORORUBBER AND MOLDED ARTICLE OF
FLUORORUBBER

Fill in Appropriate Information —
For Use Without Specification Attached: → the specification of which is attached hereto. If not attached hereto,

the specification was filed on _____ as
United States Application Number _____;
and amended on _____ (if applicable); and/or
the specification was filed on April 14, 1998 as PCT
International Application Number PCT/JP98/01692; and was
amended under PCT Article 19 on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Insert Priority Information: (if appropriate) →

<u>97207/1997</u>	<u>Japan</u>	<u>4/15/1997</u>
(Number)	(Country)	(Month / Day / Year Filed)
_____	_____	_____
(Number)	(Country)	(Month / Day / Year Filed)
_____	_____	_____
(Number)	(Country)	(Month / Day / Year Filed)
_____	_____	_____
(Number)	(Country)	(Month / Day / Year Filed)

Priority Claimed

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

Insert Provisional Application(s): (if any) →

_____	_____
(Application Number)	(Filing Date)
_____	_____
(Application Number)	(Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Insert Requested Information: (if appropriate) →

Country	Application Number	Date of Filing (Month / Day / Year)
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Insert Prior U.S. Application(s): (if any) →

_____	_____	_____
(Application Number)	(Filing Date)	(Status — patented, pending, abandoned)
_____	_____	_____
(Application Number)	(Filing Date)	(Status — patented, pending, abandoned)

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the inventor(s) who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

Raymond C. Stewart (Reg. No. 21,066)
 Joseph A. Kolasch (Reg. No. 22,463)
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